

REMARKS

Claims 1-20 remain pending in the present application. Claims 1 and 8 have been amended. Claims 15-20 are new. Basis for the amendments can be found throughout the specification, claims and drawings as originally filed.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over LaCombe in view of Pokorny, et al. (U.S. Pat. No. 6,205,292). Applicants respectfully traverse this rejection. The present invention defines a first temperature sensor which measures the temperature adjacent the heating device and a second temperature sensor which detects the temperature downstream from the first temperature sensor. When the difference between these two sensed values (the first exceeds the second by a predetermined amount) the heating operation is stopped. Claims 1 and 8 have been amended to better define that it is the difference between the two sensed values that the control means uses to control the heating device.

Claim 1, as amended, recites that when the temperature (heater temperature) detected by the first temperature detecting means exceeds a predetermined level higher than the temperature (downstream side temperature) detected by the second temperature detecting means, the control means stops heating operation of the heating device. That is, the heating operation of the heating device (e.g., the supply of the electric power to the heating device) is stopped when the condition of “the heater temperature > the downstream side temperature” is satisfied.

Specifically, in the present invention, the first and second temperature detecting means (e.g., the first and second sensors in the preferred embodiment) are provided. The first temperature detecting means is under direct thermal influence of the heating device. The second temperature detecting means is on the downstream side of the first temperature detecting means and is remote from the heating device in terms of the thermal influence of the heating device. The control means stops the heating operation of the heating device (e.g., the supply of the electric power to the heating device) when the temperature of the first temperature detecting means exceeds the predetermined level higher than the temperature detected by the second temperature detecting means.

When the temperature of the first temperature detecting means becomes higher than the temperature of the second temperature detecting means, which is located on the downstream side of the first temperature detecting means, the system, which circulates the fluid by the pump, is considered to be malfunctioning. This malfunctioning state may indicate various abnormalities. For example, in one case, it may indicate that the pump is malfunctioning, and thereby the fluid cannot be circulated. In another case, it may indicate that temperature control operation of the heating device is overrunning, i.e., is malfunctioning to cause abnormal heating.

LaCombe discloses a thermistor 116 and a thermistor 117. Thermistor 116 is part of a high-limit thermostat loop and thermistor 117 forms part of control loop to maintain a desired temperature (column 6, lines 7-16). LaCombe does not disclose, teach or suggest control of the heating device based upon a comparison of the thermistor readings as is now defined clearly in Claims 1 and 8.

Pokorny, et al. discloses a safety temperature sensor 7 which turns the heater off when a temperature limit is exceeded. A second sensor 8 senses the temperature of the gas downstream of the heater to maintain the temperature of the gas (column 2, lines 33-42). Pokorny, et al., similar to LaCombe, et al., does not disclose, teach or suggest control of the heating device based upon a comparison of the sensor readings as is now defined in amended Claims 1 and 8.

Thus, Applicants believe Claims 1 and 8, as amended, patentably distinguish over the art of record. Likewise, Claims 2-7 and 9-14, which ultimately depend from Claims 1 or 8, are also believed to patentably distinguish over the art of record. Reconsideration of the rejection is respectfully requested.

NEW CLAIMS

New Claim 15 is a new independent claim which also defines control based upon the difference between the two sensor readings. New Claims 16-20 are ultimately dependent upon new Claim 15.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the

Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

By: 

Michael J. Schmidt, 34,007

Dated: March 9, 2005

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

MJS/pmg